North India's Leading...

MANTRAM TUITION CLASSES

Expert & Highly Efficient Faculty (With Years of practical experience)

Learn the Mantra to Success

MANTRAM

Syllabus 2023-24
Panjab University

BA/BSc
(MATHS)

FIFTH SEMESTER

SCO 80-81, Sec.15D, Chandigarh
www.mantramtuitionclasses.com
9501400172, 9779797575

MATHEMATICS

SEMESTER V

Paper I : ANALYSIS - I

Max. Marks : 30
Time : 3 hrs.

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester.

Unit-I

Countable and uncountable sets.
Riemann integral, Integrability of continuous and monotonic functions, Properties of integrable functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus.
Beta and Gamma functions.

Unit-II

Improper integrals and their convergence, Comparison tests, Absolute and conditional convergence, Abel's and Dirichlet's tests, Frullani's integral.
Integral as a function of a parameter. Continuity, derivability and integrability of an integral of a function of a parameter.

References:

1. T. M. Apostol : Mathematical Analysis, Norosa publishing House, New Delhi, 1985.
2. R. R. Goldberg : Real Analysis, Oxford & IBH Publishing Co., New Delhi, 1970.
3. S. Lang : Undergraduate Analysis, Springer-Verlag, New York, 1983.
4. D. Somasundaram and B. Choudhary : A First Course in Mathematical Analysis, Narosa New Delhi, 1997.
5. Shanti Narayan : A Course of Mathematical Analysis, S. Chand & Co., New Delhi.
6. P.K.Jain and S.K.Kaushik : An Introduction to Real Analysis, S. Chand & Co., New Delhi, 2000.
7. S.C.Malik and Savita Arora : Mathematical Analysis, 2nd edition, New Age International Publishers.
8. G.B.Thomas and R. L. Finney : Calculus and Analytic Geometry (Ninth edition), Pearson Publication.

Paper II: MODERN ALGEBRA

Max. Marks : 30
Time : 3 hrs.

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester.

Unit-I

Groups, Subgroups, Lagrange's Theorem, Normal subgroups and Quotient Groups, Homomorphisms, Isomorphism Theorems, Conjugate elements, Class equation, Permutation Groups, Alternating groups, Simplicity of A_n, $n \geq 5$ (without proof).

Unit-II

Rings, Integral domains, Subrings and Ideals, Characteristic of a ring, Quotient Rings, Prime and Maximal Ideals, Homomorphisms, Isomorphism Theorems, Polynomial rings.

References :

1. S. Singh and Q. Zameerudin : *Modern Algebra*, 8th Edition, Vikas Publication, New Delhi.
2. I.N. Herstein : *Topics in Algebra*, Wiley Eastern Ltd., New Delhi.
3. J.A. Gallian : *Contemporary Abstract Algebra*, Narosa Publication House, New Delhi.
4. M. Artin : *Algebra*, Prentice Hall of India, New Delhi, 1994.

Paper III : PROBABILITY THEORY

Max. Marks : 30
Time : 3 hrs.

Note:
1. The syllabus has been split into two Units: Unit-I and Unit-II. Four questions will be set from each Unit.
2. A student will be asked to attempt five questions selecting at least two questions from each Unit. Each question will carry 6 marks.
3. The teaching time shall be five periods (45 minutes each) per paper per week including tutorial.
4. If internal assessment is to be conducted in the form of written examinations, then there will be only one written examination in a Semester.

.

SECTION A

Review of notion of Probability, conditional Probability and independence, Bayes' Theorem.

Random Variables : Concept, probability density function, cumulative distribution function, discrete and continuous random variables, expectations, mean, variance, moment generating function, skewness and kurtosis.

Discrete Random Variables : Bernoulli random variable, binomial random variable, negative binomial random variable, geometric random variable, Poisson random variable.

SECTION B

Continuous Random Variables : Uniform random variable, exponential random variable, Beta random variable, Gamma random variable, Chi-square random variable, normal random variable.

Bivariate Random Variables : Joint distribution, joint and conditional distributions, Conditional Expectations, Independent random variables, the correlation coefficient, Bivariate normal distribution.

References

Ross, S.M. : Introduction to Probability Models (Sixth edition) Academic Press, 1997.

Hogg., R.V and Craig, A.T : Introduction to Mathematical Statistics, MacMillan, 2002.

I. Blake : An Introduction to Applied Probability, John Wiley & Sons,1979.

J. Pitman : Probability, Narosa,1993.

P. L. Meyer : Introductory Probability and Statistical Applications, 2nd Edition, Oxford and IBH Publishing Co

.....